E000P-971097-00
Date: 10/01/99

MODIFICATION REVIEW

For

BEAMLINE
PERSONNEL SAFETY SYSTEM

ARGONNE NATIONAL LABORATORY
ADVANCED PHOTON SOURCE
EXPERIMENTAL FACILITIES

E000P-971097-00

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PSS Change Request
07 November 2000

1. PSS Change

   Chain A:

   Chain A will be modified to change the Front End Shutter (FES) close routine to provide an additional check insuring PS1 or PS2 and SS1 and SS2 are closed prior exiting the close routine.

   Chain B:

   Chain B is not affected as the code in the Chains operates independently.

2. Reasons for the PSS Change.

   The current Chain-A close routine only checks that SS1 and SS2 are closed and the closed limit switches are de-bounced for 1 second prior to exiting the close routine. When a Chain-B Major Fault occurs, caused by Station-A being beam active and either the Chain-B crash button input transitioning to low or the Chain-B door closed input transitioning to low, Chain-B removes the permits for all 4 Front End Shutters simultaneously with removing the Storage Ring permit. When this happens SS1 and SS2 close in approximately 500 milliseconds while PS1 and PS2 take approximately 1000 milliseconds. Chain-A detects the uncommanded operation of SS1 and SS2 and generates a serious fault which enables the Chain-A timed close. However, SS1 and SS2 close much faster than PS1 and PS2 so, the exit timer causes the close routine to exit before PS1 or PS2 are closed. During normal operation SS1 and SS2 permits are not removed until a PS1 or PS2 limit switch shows fully closed for 1 second. The premature exit allows the Chain-A permits to remain on for SS1 and SS2. The close routine should not exit until PS1 or PS2 and SS1 and SS2 are closed and de-bounced.

   The result of the early exit from the Chain-A close routine will allow SS1 and SS2 to reopen as soon as the error condition at Chain-B is corrected as Chain-B will re-enable the permits at that time.

3. Safety Impact

   The PSS system will require a double simultaneous failure of the opposite door or crash button switch and failure to remove the Storage Ring permit for the system to become unsafe.

4. Extent of the PSS Change

   This change will affect all Chain A Beamline code written or modified on or after 08 November 2000.

5. Method of Implementation

   The changes will be applied using the existing Software Change Request mechanism as defined in the Software Configuration Management Procedures document E000P-921130 most current version for the Interlock Systems and Instrumentation Group.